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Digital Legacies for Digital Natives

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“We must begin thinking like a river if we are to leave a legacy of beauty and life for future generations.”

— David Brower

“We must begin thinking **digitally** if we are to leave a legacy of beauty and life for future generations.”

— Katie Goldstein

Abstract

Our identities are becoming increasingly digital. As technology continues to advance and digital content begins to either encapsulate or provide the basis for much of our lives, it must also accommodate one's preference to highlight or conceal specific digital content post-mortem. This paper presents a summary of a two-term long study regarding the creation and implementation of a design prototype that allowed users the ability to aggregate and cultivate one's digital content, empowering users to control the narrative of their own legacies through the very medium that helped to create them – technology. Over the course of two ethnographic studies, I surveyed 20 digital natives – that is, people who have been exposed to technology from earliest youth – to determine feasible UI/UX and additional generational concerns for a self-created digital legacy platform. User feedback was used to generate a proof-of-concept implementation of a digital legacy generating tool called Digital Legacies, as well as provide future design guidelines for the burgeoning digital legacy field.

Introduction

In the decades since its invention, the internet has seen an incredible user adoption rate. Today, more than 60% of the world is connected [23], or accesses the internet daily, generating quintillions of data through the digital content users both consume and produce. IBM estimates that humanity is generating 2.50 quintillion gigabytes of data every single day, and that 90 percent of all the data ever created by mankind has been generated in the past two years alone [23]. Metadata from social media, emails, chat histories, photos and videos (both that we take and are taken of us), and web searches contribute to our digital identity. In Estonia, citizens are given e-ID numbers at birth to expediently establish residency and other gubernatorial tasks digitally [14], and more than 15 countries have since initiated similar programs. The UN and World Bank ID4D initiatives set a goal of providing everyone on the planet with a legal digital identification method by 2030 [3].

Our legacies and preservation techniques must soon follow this digital channel shift. Just as we must one day face the end of our lives, we must also grapple with the legacy of our digital identity. The idea of a digital legacy is especially pertinent to Generation Z and younger generations, as many have lived their entire lives online, rightfully earning the designation of "digital natives" [11]. More than half of Gen Z'ers spend more than 5 hours a day on their smartphones [4], and in extreme cases, some have digital presences (typically on social media) before they are even born [30].

Currently, there is little research into digital legacy design, and there does not exist a unified platform for living humans or their loved ones to create and manage the full scope of their digital identities [25]. As more of our information, both mandated and self-uploaded, comes to live on the internet, the death care and digital industries will need to solution a way for us to consolidate, preserve, and share the digital identities we create through our data, rather than simply craft a will to pass along our digital data to designated individuals or inheritors [13].

All of this begs several questions: *What is digital legacy to digital natives? Will we want to curate, filter, or amend our digital content into a legacy format as we plan for our own end of life? How?*

This line of thinking provides a starting point for this research into how, fundamentally, we will think about, create, and interact with our digital legacies. This work bridges death and dying studies and human-computer interaction to investigate how digital natives a) want to be remembered, think about the legacy they will leave behind, and how they want to transmit that to both current and future generations, b) define digital legacy, and c) want to engage with their digital information that has not yet been assigned to an associated individual or directly passed down. Ethnographic methods include surveys, interviews, and an interactive design probe.

This paper makes several contributions to the little-explored human-computer interaction research area of digital legacy for the specific user population of digital natives – members of Generation Z who spend hours of their day online.

(1) I leverage qualitative insights from an ethnographic user study into digital natives' technology and remembrance habits and experiences to create a proof-of-concept interactive prototype designed to mediate and facilitate the aggregation, curation, and amendment one's digital content into a legacy format, and;
(2) I codify both qualitative and quantitative insights from another ethnographic user study in which digital natives discuss and use the aforementioned prototype to create preliminary design guidelines to ensure digital platforms, systems, interfaces, and features will be better designed for maximum digital native desirability in the future.

Ultimately, this thesis gives context to the little-explored topic of digital legacy as it relates to digital natives.

Related Work

This research draws on prior work that articulates the ways that people deal with death and its implications digitally, describes both objectives and limitations associated with the self-creation of one's legacy, and argues for the potential benefits of creating a system that sensitively engages with digital natives' digital content.

As this research spans a number of genres, the content below is not exhaustive. Instead, the below related work was selected to highlight the ideas that influence and contextualize the work in this paper. Please note that discussions, both cited and conducted, about death, dying, legacy, and remembrance are most deeply influenced by Western perspectives, writing, and research on those topics.

Existing Products for Self-Management of One's Legacy

Many products currently exist to preserve ourselves or our loved ones after death, some physical (unique coffins and ash preservation – Coral, Tree, Spaceship [12], biometric jewelry [9], heartbeat or handwritten tattoos), and some digital (digital obituaries in the news [27], digital

gravestones [2, 19], digital avatars that live on in app form [26], Replika.ai, an AI powered chatbot that learns to be more like you the more you use it [29], and VocalID, a company that allows people to preserve their vocal legacies [35]). Furthermore, digital services that dually connect users with their ancestors while imprinting users' lives and legacy digitally have become increasingly popular – in May 2019, digital historian Ancestry.com surpassed 15 million paying customers [1]. However, none of these products aggregate one's existing digital content – rather, they memorialize an individual in a new way, be it physical or digital, for those who wish to remember them later.

Current Digital Platforms that Support Individual Memorialization

Certain platforms have developed their own legacy/memorialization features to address account usage and data after their users pass away. Multiple social media platforms such as Facebook, Twitter, and LinkedIn have specifically addressed this problem by allowing users to choose an inheritor for their account who can use or delete it after the user passes away [31] or change it to a 'memorial' account that changes how a user's content and/or profile presents itself to others. There has been a smattering of analysis of current platforms that support memorialization of individual accounts [31, 33], although few of those systems that are not major social media platforms exist today, as well as investigation into predictive classification of a social media user's mortality based on their associated content [17].

Note that if they exist, these legacy/memorial features on such platforms primarily manage or archive personal data to prevent account consumption by other individuals and corporations post-mortem. Importantly, all research only applies to the isolated platform, usually of a social media kind, rather than the entirety of an individual's digital content and accounts.

Designing for Digital Legacy: Data Management, User Preferences, and Design Frameworks

Exploration of the end of life as a site for technological innovation, intervention, and study has just begun in the HCI community [19]. While there has been some research into the potential of technology and interactive physical protypes to assist the bereaved [8, 19] there has been little HCI research into designing for one's own digital legacy, with more focus placed on reflections

of certain user groups towards adjunct topics such as pre-mortem data management, digitizing memorialization practices, and the value of digital artifacts.

In many papers analyzing and discussing user attitudes and preferences towards pre- and post-mortem data management, contributions fall broadly in one of two categories: 1) recommendations to improve pre-existing systems for pre-mortem self-data management [36], or 2) models or design guidelines for long-term digital management of social media accounts [7, 35] for inheritors to follow to responsibly contribute to a user's legacy post-mortem. Additionally, multiple papers have ethnographically interviewed specific populations to thematically analyze how current and future interactive digital systems influence and change how we are memorialized and remembered [6, 13, 18, 22]. These works generally seek to better define the scope of the field of posthumous interaction, and user attitudes towards interacting with these posthumous digital memorials, rather than how one can prepare their own posthumous digital memorial.

Past papers have also solicited the perspectives of specific populations regarding digital legacy systems and values, such as older adults [33] and young adults [32], using pre-existing digital asset aggregators or legacy prompts and exercises to hone specific design guidelines for those systems in particular. However, they have not addressed the curation aspect of digital content aggregation. Few papers have recognized that one's own management of their own digital identity and legacy can present both a burden and a reward, and have thus contributed frameworks to design systems to manage users' own digital legacy [16, 28], but have not specifically focused on designing such systems for digital natives who have an overwhelming quantity of personal digital content.

In summary, products exists to both digitally memorialize or remember depictions of users after death as well as precedent for users to digitize their accounts on specific social medias, and there has been some research into broad design frameworks and attitudes of specific populations towards digitized legacy and adjunct topics such as data management. However, there is a gap in the literature at the nexus of a digital legacy platform, design guidelines, and digital natives that my work seeks to fill through a preliminary ethnographic exploration of digital natives'

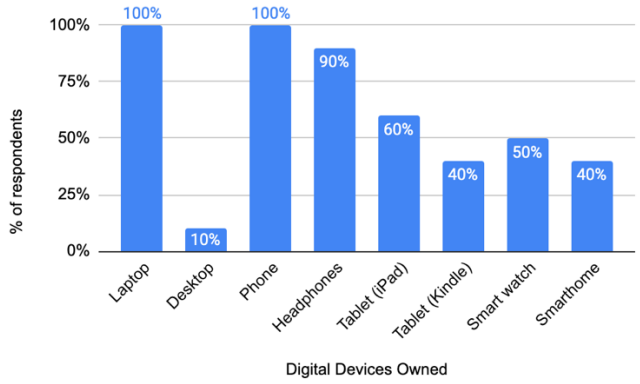
perceptions of a digital legacy platform that allows them to aggregate and curate their existing digital content for legacy purposes.

User Study

Participants

10 participants (5 males, 5 females) between the ages of 20-22 years old (median 21.4 years) were recruited by word of mouth. All were current Dartmouth students. 100% of users owned at least two digital devices through which they could access the internet (Graph 1), namely, a laptop computer and cellular smartphone. All considered themselves digital natives, with 100% responding they spent at least 1 hour a day online (with 80% spending 3+ hours a day online) generating digital content.

Graph 1. Participants' digital device ownership



Procedure

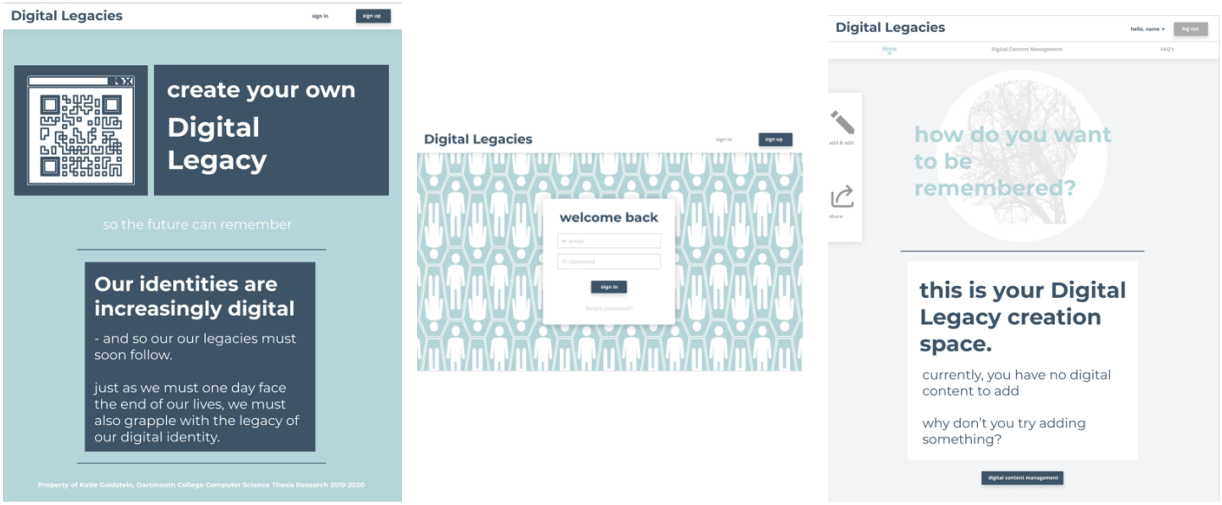
Prior to the start of each ethnographic interview, participants were informed of this thesis' privacy policy – that is, how I was to collect, transcribe, and share their data – and consented to voice collection through recording and subsequent anonymized transcription and distribution as I best saw fit. Then, participants were asked demographic questions regarding their gender identity, age, and digital device ownership and usage habits. Next, participants were asked three questions to familiarize themselves with the concepts surrounding digital legacy: how they

wished to characterize their own legacy, the transmission of that legacy, and how they viewed technology affecting existing legacy transmission practices. Then, participants were informed of the purpose of the study – to study their thoughts, opinions, and questions regarding a tool designed to enable them to curate, filter, or amend their own digital content into a legacy format. Following this, participants were instructed on how to use Figma and were given full access to a computer to interactively learn more about the prototype themselves. Participants were encouraged to voice their opinions, thoughts, and questions while using the tool. Upon completion, I engaged the participant in first a discussion, then a series of Likert scale ratings regarding their proposed usability of the platform as well as various emotions and desirability and future direction of a feasible product. Finally, participants were given an opportunity to voice outstanding questions, comments, and concerns.

Design Prototype – "Digital Legacies"

Participants were instructed to interact with a design prototype to tease out reactions relating to a prototype product aimed to help them understand the digital content and potential features to create their own digital legacy. The prototype was modeled and rigged together in Figma as to simulate a functional website (Image 1). A video that depicts all features of the design probe can be viewed here: https://youtu.be/3WbqVlu4vtk.

Image 1. Digital Legacies Design Prototype



Design of the Design Prototype

The design prototype used in the above study was created after completion of a separate ethnographic user study with 10 participants (5 females, 5 males) ages 20-21 (median 21.6 years). Participants were distinct from those interviewed in the above study and were again recruited by word of mouth. During those studies, participants were asked to modify a definition of digital legacy as it currently exists in HCI literature [33], as well as reflect on the meaningfulness and importance of reminders of the dead, reminiscing, and the nature of physical and digital mementos from others whom had passed away during participants' lifetimes. Participants were then asked if they had thought about their own digital legacies and were instructed to search themselves on Google. Participants were show a list of types and examples of digital content and accounts and were asked to detail what digital content they would want to include or exclude in their own digital legacy provided the basis for the 10 specific accounts featured in the eventual design probe. A wrap-up discussion of logistics and utility of the digital legacy website followed, and provided the basis for many features in the design probe such as designation of an inheritor for both one's digital legacy as well as specific accounts, pre-management of digital content allowing one to choose to send data to one's inheritor and/or delete the account upon their death, ability to upload one's own content, the ability to add a comment board and/or a donation to a cause, and ability to share one's in-progress digital legacy with others.

Use in the Study

Before using the Design Prototype, participants were instructed as to how to utilize Figma, and were told of any Figma limitations (such as the inability to enter text in textboxes). During use, I was present to answer any and all questions participants had regarding the operations, scope, and constraints of Digital Legacies, much like a platform tour.

Results & Analysis

I collected a total of 185 pages of single-spaced transcripts from our participants, or 5.83 hours of material (25-45 minutes x 10 participants). Transcripts were transcribed by professional transcriptionists through rev.com, an online transcription service, as per participants' consent. I began the analysis process by reading and re-reading the transcripts, classifying and grouping concepts into similar groups, then coding them into themes [5], using an iterative grounded-theory approach to evolve themes as per many ethnographic interview studies [15]. I also examined their designated Likert Scale values to augment specific themes.

Themes

Dearth of Reflection for Remembrance

Promoting self-reflection is difficult for but universally important to digital natives

"I've never really thought about that" (P1, P3). Most participants hadn't thought much about their own legacies, citing their youth and good health as reasons to avoid the topics of death, legacy, and remembrance which presented some difficulties as they had to confront this topic in the study. However, a majority (5) participants wanted to be remembered by others. Participants noted several dualities of remembrance and legacy: 1), they wanted to be remembered by those who knew them as well as those who did not, and 2) wanted to be remembered for their character and personal interactions as well as their professional accomplishments. Generally, participants indicated they wanted to be remembered positively, citing ideal personal qualities as how they would like to be remembered: "good person" (8), "made an impact" on the world and those around them (7), "kind" (3) "good friend" (2). To communicate these things about themselves through an inheritance model common to American death and dying practices, most participants indicated they wished to pass down items both tangible and intangible that already exist or could exist in a digital format: stories and memories (6), photos (4), treasured objects (4), memoirs (3), and videos (2).

Legacy, Digitized

The role that technology plays in our lives (and will play in our legacy) is complex

"Technology as a medium for remembrance is tricky" (P5). Participants were largely torn (both individually and when aggregated) as to the utility of technology used to create, augment, and/or

promote one's legacy. Many indicated that it was useful in it promotes accessibility of all content, both physical and digital (6), encourages discovery by democratizing the spread of information (3), generate empathy through shared experiences such as remembrance (3). However, many also shared dissonant views concerning the complications technology presented when used in a legacy context. Overwhelmingly, participants indicated the pervasive 'curated' nature of much digital content, especially in social media accounts, promoted a performative and thus false representation of both themselves and others (7). They pointed out that the "cold and impersonal" (P3) anonymous community (2), prevalence and ease of digital editing (2), and permanence of bad moments that technology both creates and allows contribute to a lack of sacredness and community that normally surrounds societal rituals of death, remembrance, and legacy. Ultimately, participants grasped both the potential and danger of technology in creating, augmenting, and perpetuating one's legacy, saying, "technology is a double-edged sword sometimes" (P7). While if used improperly, technology could present a danger to one's legacy and how others consume it, when used correctly, it can accomplish one's means in powerful and easy ways: "technology could ensure your story is memorialized, I guess, the way you wanted it to" (P4).

Control

Death as an exercise in its futility, technology as a way to regain it

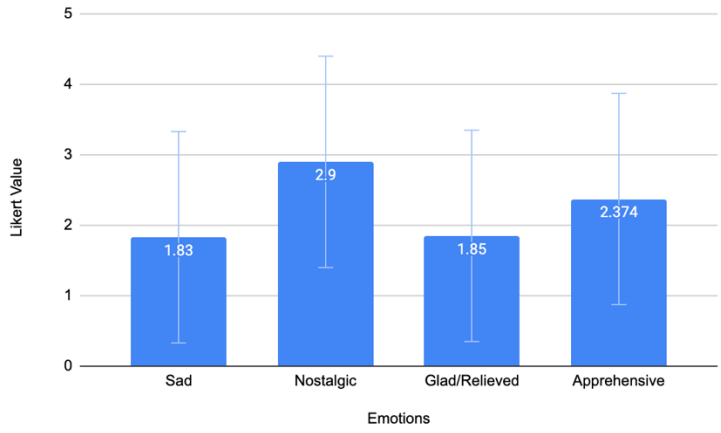
"When I think of legacy or how people remember me, I don't feel like I have as much control as I want in that no matter what I do…. Ultimately in the end they are going to choose how they will remember me. Th[e design prototype] allows me to a part of that process in a way, which is kind of cool to think about" (P3). The construction of Digital Legacies is predicated on the human desire to control the uncontrollable – in this case, one's own image after death, or legacy, by way of technology. Many participants noted that social media has normalized the notion of digital self-imagery for digital natives in particular (3). Digital Legacies, then, allows them to play upon these same processes of self-curation for a similar, but much more all-encompassing aggregation of content (both digital and physical) on a digital medium. In this way, Digital Legacies also democratizes the ability to create one's own digital legacy. Still, one participant pushed back on this aspect of control, stating that death is an exercise in the absence of one's perceived control over their own image: "an aspect of passing away is allowing people to

remember stuff about you that you may have not noticed and things like that" (P6). Allowing others to contribute to your own curation is another important aspect of one's legacy and is represented in Digital Legacies through the comment board.

Likert Scales

The Likert scale questions asked at the end of the session revealed the highly personalized and environmental aspects that would promote users to appreciate and adopt new technology. When asked if having a way to aggregate one's digital content into a legacy was important, participants leaned slightly more positive than neutral with an average rating of 3.714 (range: 2.5-5, standard deviation: +/- 0.77). Furthermore, when asked if they would use this tool if it did exist, participants again leaned slightly more positive than neutral, with an average rating of 3.38 (range: 1-4.8, standard deviation: +/- 1). When asked to rate their recognition of certain emotions while using the tool, participants again had a variety of opinions: (range: 1.83 – 2.9, standard deviation: +/- 1.5) (Graph 2).

Graph 2: Likert Scale Results.



Design Implications and Discussion

Firstly, and most notably, I created an interactive proof-of-concept interactive website designed to enable end-users to create their own digital legacies by curating their own digital content.

Secondly, I formalized a number of guidelines for research and implementation regarding digital legacy enablement technology from qualitative feedback from participant interviews and empirical study results. Through our discussion questions on remembrance and legacy, technology, and the digital legacies design prototype, I was able to determine some key heuristics digital natives prioritized/needed in the context of digital legacy-building:

1. Acknowledge the emotional limitations and complications of technology

Users understand that technology plays an important role in our lives and in the creations, for better or for worse, and as it continues to evolve so will how we interact with ourselves and others in the digital and physical worlds. Acknowledging the paradoxical duality of the eventuality of technological dominance and its inherent awkwardness, coldness, and voyeurism is especially important when dealing with a process so sensitive as one's legacy. In the future, perhaps more immersive technological options will enable us to supersede these negative associations.

2. Design with empathy

Digital Legacies is not just about helping people create a legacy for financial gain – it is about making the creation process an exciting and reassuring one for all users of any age such that they are intrinsically motivated to create or update their own digital legacy, and perhaps even enjoy the reflective process. Balancing functionality with user testing with a focus on their emotional response will prove vital in the success of an eventual product.

3. Design for trust

"[It's] scary – how much of my information is online" (P1). Users will trust digital legacy technology with entire life archives of data. Prioritize security – this gift should be protected to ensure they feel safe and calm while creating their legacy and in knowing that it will exist after them. This will also differentiate future products in the market.

4. Prioritize personalization

Personalization promotes the feeling of control. Allowing users to personalize a digital memorial of themselves is a resoundingly personal process by definition. The desire for highly

personalized nature of one's legacy, especially in a digital format, is supported not only by the human desire to be known as unique, by the variable nature of the themes and Likert scales gleamed during ethnographic sessions. Features and user interface design should support many ways for users to personalize their Digital Legacies across many digital content accounts and devices.

5. Subvert capitalistic tendencies

Multiple participants (4) enquired as to the payment structure of this platform once it became both functional and available to the public. Digital Legacies was not intended to be a commodity – everyone is entitled to their own legacy (and a way to create it – note that the internet too was founded on principles of equal access) and accordingly, and so any decision to require some form of user payment to support the platform must be in the customer's best interest as to promote a genuine and trustworthy place for users to aggregate their digital content into a legacy format. Furthermore, if and when it comes time to launching such a product, think of how marketing will come across to all kinds of users – for example, social media advertising for Digital Legacies could be especially traumatic or enabling for users struggling with the loss of a loved one or their own mental health concerns. Perhaps self-discovery and promotion may cultivate the desired user mindset and thus experience Digital Legacies so seeks to benefit.

In summation, when designing technology to enable anyone to curate, filter, and amend their digital content into a legacy format, it must be approachable, easy-to-use, secure, & highly personalizeable. Hopefully, this work presents both a human-centered methodology and design guidelines for digital legacy technology.

Limitations

This study was not without its limitations. Firstly, all participants were sourced from Dartmouth's undergraduate student body. While they represent a diverse group, they are nonetheless limited in terms of age, ethnicity, technological starting age, and self-reflective tendencies and experience. Secondly, broader limitations of my thesis are largely due to 1) the

vaguely defined field of digital legacy in human-computer interaction – much time was spent discussing the definition of digital legacy and its relation participants' lives rather than actually creating it over the course of the studies and 2) and the time constraints allotted to the study by the celerity associated with the Dartmouth terms. Thirdly, the technical implementation of the design prototype, as well as an example digital legacy page, was limited by privacy restrictions set by specific account and their APIs as well as those of individuals' own digital content.

Future Work

Following the results of this study, much work can and should be done to further explore the nebulous field of digital legacy – both within the scope of this experiment and in defining the burgeoning intersectional possibilities of technology and legacy. Due to the scope of this project, a more rigorous technical implementation is needed. This implementation could also allow participants the ability to curate their own digital legacy (or at least view a fleshed-out sample digital legacy creation space) within the scope of the user study, be it in one session or over a longer time period to prompt deeper reflection. Additionally, the ethnographic user study could be conducted with a wider range of participants from a variety of age ranges, technical tendencies, digital content archives (such as famous people), and those closer to death to guarantee a more diverse end-user thematic narrative. Furthermore, while the web interface works well for a complicated task, expanding the digital legacy interface to other devices such as mobile, tablet, etc. would offer end users a diversity of choice when viewing and participating in the creation of their digital legacy. Looking beyond the scope of this study, further investigation into both the concerns raised by participants concerning the privacy and security of their accounts and digital content and the feasibility of such fixes is needed. Inheritors could follow emerging methods of digital stewardship to ensure these digital legacies are maintained for generations. I would also be interested in collaborating on the design, tone, and features of with mental health professionals to ensure the site is both a positive, calming, and reflective experience and does not enable those with suicidal tendencies. Further studies could not only explore the ability to link legacies together to promote 'shared' or 'co-created' legacies, but could also explore the potential of existing and emerging technologies, such as VR/AR,

Replika.ai chatbots, and more, to create more immersive, genuine, and exciting digital legacy experience. Finally, one's death and legacy requires a constant awareness of both universal and local legacy traditions, belief systems, and law. More exploration into the different ethical, technical, cultural, and legal experiences individuals face before death and how technology can support the transformation of their assets and legacy onto a digital platform is necessary to make this ability available to all.

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